DEPENDENCY RATES, POVERTY AND SAVING RATES IN THE LDCs: EVIDENCE FROM CROSS-SECTIONAL HOUSEHOLD DATA IN TANZANIA

Michael O.A. Ndanshau
University of Dar es Salaam

1. Introduction

Despite the criticisms it has attracted in development economics, capital is still considered to be one of the key prerequisites for economic growth and development. Accordingly, it is contended that the Least Developed Countries (LDCs) exhibits low levels of economic growth and development than the economically developed countries (EDCs) because they are plagued by low capital accumulation (among others, see Myrdal, 1972; Rostow, 1954; Nurkse, 1953). The poor capital accumulation among the LDCs is attributed to, among others, high birth rates that adversely affect savings for investment by increasing the dependent population. Several authors, such as Leff (1969) have used empirical evidence to argue that "high dependency ratios - and ultimately high birth rates - are among the important factors which account for the great disparity in aggregate savings rates between developed and underdeveloped countries" (p.893-94). Challenged by studies by Gupta (1971) and Adams (1971) that used Leff's (1969) cross-country data set, Leff (1971, 1980) defended his empirical findings that dependency rates exert adverse effect on saving ratios in the LDCs.

Further exposure of the saving-dependency rates nexus has led to quite inconclusive results. A study by Ram (1982) that used an expanded cross-country sample and the specification used by Leff (1969) demonstrated little significant adverse effect of dependency rates on savings in the LDCs. Similar result were obtained by a cross-country study by Rossi (1989) and a study on Tanzania by Rutayisire (1990). Nonetheless, a study on Kenya by Njuguna (1994) and a study by Mjema (1995) on Tanzania[1] bear evidence in support of the contended inverse relationship between dependency rates and savings in the LDCs.[2]

1 Mjema (1995) only modeled a variable for young dependents. Yet he concluded that the results are same as that obtained by Leff (1969). This appears as an over-kill. Adams (1971) shows that when either the variable for the young or old age dependant population is modeled separately none of them is a significant determinant of the savings ratios in the LDCs. Second, by modeling demographic factors in various standard savings functions, Ram (1982) observed that the closer he moved to the Leff's (1969) sample and specification, the greater was the similarity of the estimates with Leff's results. In fact, the results obtained by Mjema (1995) are also suspect because he used total population rather than the total labour force to obtain the dependency ratio.

2 The logic in this hypothesis is that the dependent members of the household are a net economic burden because they do not contribute to output but exaggerate consumption expenditures that strain saving capacity. See, Leff, 1969; Öhlin, 1967; Fry, 1972; Friedman, 1957; and Spengler, 1951.

The purpose of this paper is to present empirical evidence on the influence of dependency rates and poverty on savings in 256 peasant households sampled in three agricultural districts in Northern Tanzania. The paper has been motivated by the continued controversy and the use of aggregate time series or cross-country data sets to analyze the contended adverse effect of dependency rates on saving in the LDCs. In this regard, the consistency of the results presented in this paper to those obtained when aggregate data sets are used is of interest. Besides, the hypotheses investigated have some relevance to the savings mobilization and poverty alleviation policies and strategies used in Tanzania, a poor country where the majority (about 60%) of its mostly rural based population are poor and exhibit high birth rates (estimated at about 3 percent).

The rest of this paper is organized as follows. Section 2 presents methodology of the study.

Section 3 presents descriptive and regression results. The main conclusions and arising policy conclusions are presented in Section 4.

2. The Estimation Models

The function for estimation builds on the pioneer work by Leff (1969).[3] On the basis of the pretests, the following saving functions have been estimated:

$$(1) \qquad \log S^{pc} = -\beta_0 + \beta_1 \log y + \beta_2 \log L^{pc} - \beta_3 \log D + u$$

$$(2) \qquad \log S^{pc} = -\beta_0 + \beta_1 \log y + \beta_2 \log L^{pc} - \beta_3 \log D_1 - \beta_4 \log D_2 + u$$

where S^{pc} is savings per capita, y is expenditure per capita (proxy for income per capita), L^{pc} is land per capita, a proxy for wealth also used by Iqbal (1983). D_1 and D_2 are dependency ratios for the young (at or below 9 years) and old age (at or above 65 years) population cohorts, respectively, while D is the sum of D_1 and D_2, and u is the stochastic error term. The coefficients of D, D_1 and D_2 are expected to be negative.

Given the well-recognised difficulties of measuing income in rural areas in developing countries (see Boateng et al, 1992), per capita expenditure (y) is a ratio of total expenditure

3 It is also worth noting that the regression of the total savings on either income or total expenditure yielded poor results. And a regression of per capita savings on per capita income also yielded poor results. The latter pre-tests rules out measured disposable income how so ever defined. Also ruled out, but by the type of data, is a variable for growth rate used in the original study by Leff (1969).

to the hosehold size.[4] Savings per capita (S^{pc}) is a ratio of total household savings to the household size. The aggregate total household savings are defined to include non-financial (real savings) and financial savings (currency hoarding, savings deposits in informal and formal financial institutions — banks, savings and credit societies — and contractual savings in the form of life assurance policies). The dependency ratio (D) is the ratio of the total dependent population to the total labour force of the household.[5] The cut-off of 9 years and 65 years has been used to calculate the dependency ratio of the young age (D_1) and old age (D_2) cohorts, respectively.[6]

The cut-off nine years follows from observations made in the field which demonstrated that children participate in productive economic activities at far less than 14 years (also see Adams, 1971 and Boserup, 1985). In many rural areas of Africa, the young dependent population contributes more to the family provision of goods and services than it consumes (see Boserup, 1985, p. 389). Similarly, the cut-off of 65 years for the old age population cohort, has been motivated by the observation that labour force participation rates of the old age cohort are quite high in the LDCs (See Bilsborrow, 1979, p.25). In addition, the survey established that the aged members in the sampled households engaged in "heart-pacing" activities, which in some cases involved farming and attending livestocks. Given, the proportions of the young age and old age brakets of dependants, the residual constituted the effective labour force.

The saving functions presented above were estimated by using data for 256 households collected by a one shot survey which covered 20 villages in three agriculture based districts (Arumeru, Babati and Mbulu)in Arusha region in Northern Tanzania. The functions are estimated at two levels; pooled sample regression and stratified sample regressions for poor and rich households. The poor households are discriminated against the rich peasant households by using an arbitrary poverty line based on the decline distribution of

4 The most important capital expenditure items in the sampled households included outlays on farming (for example hiring of labour, tractors and plough services, seeds, and manure purchases), business (piggery, charcoal retail, brewing of liquor), purchase of non-consumer assets (for example, purchase of donkeys, livestock, jewellery, bicycles and radios).

5 Identification of the proportion of dependant population on the basis of the age structure of households is quite intricate. This is partly because of the difficulties in establishing the proportions of the household population seeking work and which are not at a given point in time (see Collier, *et al.*, 1990). And partly, it is because of the problem arising from difficulties in categorizing the proportion of the household population that is incapable to participating in economically productive activities either because they are too young or too old. In the analysis carried out is this paper, underemployment and frictional unemployment is assumed to be non-existent.

6 The cut-offs used differ with that used by Mjema (1995) and Rutayisire (1990) in Tanzania and other countries (See the review in Ram, 1982).

annual per capita household expenditure (PCHE).[7] The arbitrary poverty line is drawn at the third decile by which the incidence of poverty fall on 30 percent of the sampled households which had a PCHE of less than Tshs. 6,771 per annum.

3. Results

According to the survey data,[8] the annual mean income epr apita was TShs. 9,863 and for specific district it ranged from TShs. 11,145 in Arumeru District to about TShs. 7,961 in Mbulu District. About 52% of the annual income earned by the sampled households was spent on food; and, as in most LDCs (see Nicholson, 1992, p. 134), expenditure on food accounted for the largest proportion (63.1%) of total household expenditure in the sampled areas.

The size of the households surveyed varied across the three districts covered by the survey. Babati District had 63.71% of the households surveyed which consisted of 4-9 members; while Mbulu District had 57.5% of the households surveyed which consisted of 6-10 members (Ndanshau 1996). Less than 5% of the sampled households in each of the three districts had 1-2 members. The range of dependency ratios in the households sampled was 0.34 - 0.73 in Babati District, 0.17 -1.07 in Arumeru District and 0.38 - 0.73 in Mbulu District.

According to the survey results, for both specific district and pooled samples the households with a small population of dependants had relatively higher annual mean savings per capita.[9] While this is consistent with the hypothesised inverse relationship between savings rates and dependency rates, the savings ratios of the sampled households do not appear to decline consistently with the increase in the number of dependants

7 The *World Development Report* (1990) suggests income as a better reflector of the well being of a household because it determines most of those factors including the adequate consumption of goods and services, health, status, achievement and security (see, Squire, 1980, p.5). However, according to Collier *et al.* (1990) the income and *per capita* income of the household are poor proxy measures of the standard of living and they are likely to misidentify the poor (p.70). Moreover, the arbitrary poverty lines are noted to have various inadequacies (see, Fields, 1989).

8 Rarely do rural households in the LDCs keep income and expenditure statements. Besides, the rural economies are known to exhibit substantial non-monetary based income, expenditure, saving, lending and borrowing transactions in the rural areas. In addition, the administration of the questionnaire to the head of the household creates a danger of under-estimating the income and total savings of the household, especially where there are working members in the household "who take food from the same pot".

(see Ndanshau, 1996). Similarly, there is no a clear inverse relationship between the saving ratios and the dependency ratios in the sampled households because the former did not appear to change dramatically with changes in dependency rates.

A discrimination of poor against the rich households by use of the arbitrary poverty line demonstrates that the rich peasant households exhibited relatively larger volume of savings than the poor households did. And, in general, the amount of savings by poor households was about 26% that of rich households and about 20% of the total savings of the sampled households. However, there were district variations. Poor households account for about 23% of the total savings in Babati district; and in Arumeru and Mbulu they accounted for about 13% and 31%, respectively. On this account, it is not that the rural poor "are too poor to save", rather, they save less than rich peasant households.

Furthermore, the multivariate regression results presented in Table 1 demonstrate that all the estimated function have a good explanatory power and, as expected, per capita income is a statistically significant of saving in the rich households.[10] However, the dependency ratio (D) coefficient in the pooled regression equation (1-a) is positive and not statistically significant. The same result obtains in equation (1-b) estimated with decomposed dependency rates. Moreover, the regression results in Table 1 demonstrate that the dependency ratio (D) coefficient is positive in both functions estimated for the rich (equation 2-a) and poor households (equation 2-b); and, in the latter function is statistically significant at the 5% test level. The results of the two functions demonstrate that dependency rates have a relatively larger (0.5) positive effect on savings in poor households than in rich households. This evidence is inconsistent with the hypothesised inverse relationship between saving rates and dependency rates. This is also reflected in the estimated *beta* coefficients which shows that the dependency rates have a relatively larger (0.261) positive effect on saving in poor households.

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9 Fairly extensive literature surveys in Alberici and Baravelli (1985), Timberg and Aiyar (1984) and Ndanshau (1996) demonstrate that monetary savings constitute a small proportion of total rural savings. The remaining lion's share is constituted of livestock, crop output, food stuff, precious metals, and self-financed investment made on farm houses, improvements on land (digging of drainage or irrigation canals or construction of dikes, etc.), which do not feature in the national income accounting.

10 This on the basis of the estimated F-statistics that is significant at a 1% test level for all the equations, except equation 2-d. The adjusted coefficients of determination are rather low. Similar low adjusted coefficients of determination were obtained in most of the previous cross-country studies that employed aggregate time series data set. Also note that low adjusted coefficients of determination are characteristic of most studiers based on data sets from household budget surveys.

Table 1: Estimated Savings Functions Using Cross-sectional Household Survey Data

Equ. No.	Type	Constant	Log y	Log L^{pc}	Log D	log D_1	log D_2	Adj.R2	s.e	F. Stat.
1-a	Pooled	-0.409	0.829	0.436	0.149			0.203	1.07	18.8*
	Sample	(-)	(0.301)	(0.267)	(0.086)					
		-0.249	4.700*	4.181*	1.391					
1-b	Pooled	-2.141	1.024	0.226		0.192	0.054	0.175	1.12	4.0*
	Sample	(-)	(0.359)	(0.151)		(0.118)	(0.030)			
		-0.599	2.666*	1.191		0.779	0.184			
2-a	Rich	0.184	0.758	0.402	0.059			0.13	1.03	8.8*
	households	(-)	(0.226)	(0.251)	(0.038)					
		0.075	2.914*	3.242*	0.502					
2-b	Poor	7.629	-0.093	0.442	0.495			0.107	1.18	3.1**
	households	(-)	(-0.016)	(0.288)	(0.261)					
		1.123	-0.117	2.183**	1.963**					
2-c	Rich	-10.628	1.912	0.244		0.234	-0.258	0.16	1.10	2.3***
	households	(-)	(0.521)	(0.126)		(0.151)	(-0.151)			
		-1.576	2.666**	0.629		0.650	-0.566			
2-d	Poor	10.112	-0.379	0.225		0.208	0.227	-0.051	1.16	0.7
	households	(-)	(-0.070)	(0.189)		(0.134)	(0.118)			
		1.096	-0.351	0.957		0.573	0.518			

Note: * = 1 percent test level of significance.
** = 5 percent test level of significance.
*** = 10 percent test level of significance.
Figures in parentheses are *beta* coefficients.

By decomposing the dependency ratio, functions 2-c and 2-d show that the young age cohort (D_1) exerts positive but insignificant influence on saving in the rich and poor households. The old age cohort (D_2) exerts an insignificant negative effect on the saving amongst rich households as predicted and insignificant positive effect on the poor households.[11] In addition, the *beta* coefficients in equations 2-c and 2d demonstrate that the young age population exerted a larger positive effect (0.151) in rich households than in poor households. In contrast, the old age population (D_2) exerted a larger adversely effect (-0.151) on saving in rich households than in poor household where the effect was positive. Overall, the regression results suggest that the dependent population in general

11 Interchange of sign in equation 4-b demonstrates a not quite far-fetched possibility that the old age in better endowed households consume but do not participate in economic activities. Rather, instead the young in the rich households make a positive contribution that may compensate for the unproductive consumers in the households.

and specifically that consisting of the young age population has a positive effect on savings in rural households, particularly so within poor households. This finding is inconsistent with the conventional wisdom but suggests that the young contribute marginally towards savings in the rural household through participation in agriculture and other economic activities of the household as argued by, among others, Adams (1971) and Bilsborrow (1979).

4. Conclusion

This paper has presented empirical evidence on the effect of dependency rates and poverty on savings on the basis of a one-shot survey of rural households in Northern Tanzania. The pooled regression results demonstrated that the dependency rates do not unambiguously exert negative and significant influence on savings in the sampled households. On the contrary, the dependent population appears to exert a statistically significant positive influence on savings in poor households and a positive but insignificant influence on savings in rich households. Moreover, the results demonstrate that the poor are not 'too poor to save', rather, they save less, and thus exhibit smaller marginal propensities to save (MPS) than rich households. Accordingly, income is a determinant of savings in rich households but not the poor households where wealth, measured by the land cultivated, significantly influences the saving capacities of poor households. Generally, the results of this paper suggest that dependent population may, up to a certain optimal size, be instrumental to saving in rural households; and that instruments to mobilize rural savings should be targeted on rich households and complemented by policy measures to increase the saving capacities of poor households. Further analyses of the hypotheses on saving, dependency rates and poverty are also called for; and, that could include an exploration of possible feedback between savings, income and dependency ratios.

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Abstract

This paper examines the hypothesis that dependency rates and poverty adversely affect private savings in developing countries (LDCs) by using panel data from a one-shot survey of peasant households in Northern Tanzania. Overall, the multivariate regression results demonstrate that dependency rates have a statistically significant influence on savings in poor households and an insignificant positive effect on savings in rich households. The same positive but insignificant influence of dependency rates also obtains in the overall sample results and, by and large, when the dependency ratio is disaggregated. Empirical analysis also shows that wealth and income are determinants of savings in the rich peasant households and only cultivated land (per capita) determines savings in poor peasant households. The estimated income elasticity of savings is greater in the rich household than in the poor households, implying the latter saves less out of current income. The empirical results of this paper fail to support the 'claimed' adverse effect of dependency rates on savings in the LDCs, at least in the sampled area in Tanzania. This empirical finding undermines birth control policy measures in Tanzania. Besides, to the extent that rich households save more out of income and wealth underscores targeting of financial saving instruments to the rich rural households and, the adoption of policies that would increase saving capacities of poor households is implicit from the results. The findings and the main conclusions of this study need, however, to be treated cautiously because of the specificity of the area covered. Further exposure to data of the dependency ratios-savings nexus to household budget survey data is required.

TAUX DE DÉPENDANCE, PAUVRETÉ ET TAUX D'ÉPARGNE DANS LES PAYS MOINS DÉVELOPPÉS: LES RÉSULTATS D'UNE ÉTUDE SUR UN ÉCHANTILLON REPRÉSENTANT TOUS LES TYPES DE MÉNAGES EN TANZANIE.

Résumé

Sur la base de données recueillies au cours d'une étude sur les ménages paysans dans le Nord de la Tanzanie, cet article se propose de vérifier l'hypothèse d'après laquelle, dans les pays en voie de développement, le taux de dépendance et la pauvreté influeraient negativement sur l'épargne privée. Dans l'ensemble, les résultats de la régression à plusieurs variables démontre que les taux de dépendance ont un effet statistiquement significatif sur l'épargne des ménages pauvres et un effet positif non significatif sur l'épargne des ménages riches. On observe une influence également positive, mais non significative, des taux de dépendance des résultats relatifs à l'échantillon dans son ensemble et, en général, quand le ratio de dépendance est désagregé. L'analyse empirique démontre aussi que la richesse et le revenu sont les déterminants de l'épargne dans les ménages paysans pauvres. L'élasticité estimée de l'épargne par rapport au revenu est plus élevée pour les ménages riches que pour les ménages pauvres ce qui implique que ces dermiers épargneraient moins sur leur revenu normal. Les résultats empiriques de cet étude ne confirment pas l'effet négatif supposé des taux de dépendance sur l'épargne dans les pays en voie de développement, au moins en ce qui concerne la région de la Tanzanie considérée. Ces résultats empiriques sapent les fondements de la politique de contrôle des naissances de la Tanzanie et indiquent aussi que, dans la mesure où les ménages paysans riches épargne davantage sur leur revenu et leur richesse, il n'y a pas de raison de mettre en place des instruments pour l'épargne financière spécialement pour ces derniers, mais qu'il faudrait plutôt adopter des politiques visées à augmenter la capacité d'épargne des ménages pauvres. Les résultats empiriques et les conclusions de l'étude devraient, toutefois, être traités avec prudence à cause de la spécificité de la région considérée. Il est nécessaire de recueillir plus de données sur le lien entre taux de dépendance-épargne et budget des ménages.